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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/729,804	WANG ET AL.	
	Examiner	Art Unit	
	Glenford Madamba	2151	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to remarks and claim amendments filed by Applicant's representative on September 9, 2007.

Response to Remarks and Arguments

1. Applicant's remarks and arguments filed on September 9, 2007 have been fully considered but are deemed unpersuasive to overcome the rejection of the claims in view of the Carter and Patel prior art references.

With regards to the claims, and in particular claim 1, Applicant argues that neither Carter nor Patel, either individually or in combination, teaches or discloses particular features of the claimed invention, which recites:

"An egress rate controller monitoring content traffic transmitted from an edge network node of a packet-switched communications network node comprising [Abstract]:

a. a leaky bucket having an initial maximum number of tokens which decreases as packets are received in an associated output buffer at a reception token rate for transmission (e.g., token/leaky bucket shaper) [0084];

b. a plurality of token availability threshold level registers specifying a corresponding plurality of token amounts defining token availability regions (e.g., buffers 25a-c) [Fig. 4]; and

c. a packet transmission suppression controller (Router 13) [Fig. 2] selectively suppressing transmission of a packet having a traffic class association (decreasing buffer output rate) [Abstract] (e.g. Router with traffic rate control 304) [Fig. 3] based on a current token availability level being within a token availability region specifying transmission suppression of packets of the traffic class.

With regards to the above claim recitation, Applicant argue that "neither Carter nor Patel teaches the use of multiple token availability threshold registers to define token availability regions, and determining whether to suppress transmission of a packet based on the current token availability level (i.e., current occupancy of the bucket) being within a token availability region which specifies transmission suppression of packets of the traffic class of the packet." The Office respectfully disagrees and submits that Applicant has misinterpreted and/or not fully considered all the teachings and disclosures of the prior art reference(s) applied in the rejection of the claims.

In support of his argument, and with respect to the Carter prior art reference, Applicant firstly remarks that even while Carter expressly discloses the recited feature of

the "leaky bucket" as recited by claim 1, "Carter discusses leaky buckets only twice, towards the very end of the description of the method, and only in general terms." As such, Applicant remarks that the objective of Carter is clearly not to provide a leaky bukcket routine for managing traffic flow rates. The Office respectfully disagrees.

In response to the argument, the Office firstly and strongly asserts with emphasis that Carter expressly and factually discloses as part of his invention the recited feature of the "*leaky bucket*" as required by claim 1 (e.g., token / leaky bucket shaper) [Fig. 7] [0084]. The Office thus asserts that Applicant's commentary that Carter discusses the leaky bucket 'only twice' or 'only in general terms', has no bearing on the fact that the recited limitation of a 'leaky bucket' is expressly disclosed by Carter; nor does it change the fact that the argued feature of a leaky bucket is taught by Carter, as acknowledged by Applicant himself, in view of his own commentary.

Further, the Office notes that not only does Carter teach or discloses the argued claim recitation of the leaky bucket, he also additionally teaches other prescribed features of the claim. Significantly, Carter discloses as his invention a method of controlling egress of traffic from an output buffer of a communications device so as to effect congestion control (Claim 2, pg, 6). As taught by Carter, for example, "*traffic shaping or grooming can be applied to the aggregate traffic at the egress link of each add multiplexer, the total traffic consisting of a superposition of traffic flows*". Carter also discloses a plurality of egress links 42, with each egress link associated with a

respective egress port 131 and a scheduler 133 (as recited by claims 1 and 3 of the claimed invention, respectively). More significantly, Carter expressly teaches in one embodiment that "traffic which is forwarded to the second domain 92 is typically '*token-bucket shaped*' to fit within SLS (signaling link selection), e.g. using a so-called three color marking. The traffic grooming at egress from the first domain reduces drop probability while transiting to the other domain thus improving "customer service levels" (classes).

Carter expressly discloses Figure 10, which "shows a *multi-service traffic control arrangement* in which the 'traffic' is groomed or shaped *at egress* from a plurality of buffers 25a-c at an edge router 13a to reduce the effects of long range dependence on some '*traffic classes*' at a downstream core router 13b [0086-0087]. In fact, Carter expressly teaches, with respect to traffic shaping / grooming and or controlling traffic 'burstiness', that "typically traffic is segregated according to the class of service" (traffic classes). "*Although three buffers are shown, it will be appreciated that the number of buffers will be chosen according to the number of Service Classes envisaged and the volume of traffic which the router is designed to handle*" [0078]. Carter also discloses Figure 4 which illustrates a router which selects and "preferentially services" traffic in a manner that provides a reduced long range dependence of the output of traffic (e.g., "slowing down of traffic" depending on "current buffer occupancy", for example) [0076].

As noted by Applicant:

"The claims of the present application are directed to apparatus and methods for effecting rate control of egress traffic from an edge network node and of ingress traffic to an edge network node. A leaky bucket is used having multiple threshold level registers. Broadly, when a packet is received, a traffic class of the packet is checked, and a determination on whether to suppress transmission (in the case of egress traffic) is made based on the traffic class of the packet and on the occupancy of the leaky bucket as indicated by the multiple threshold level registers and by a current token availability of the bucket. A similar decision is made for ingress traffic using similar considerations, namely the traffic class of the packet and the occupancy of the leaky bucket as indicated by the current token availability and the multiple threshold level registers, except that a probability discard register associated with each traffic class is also considered, and that the packets are discarded rather than suppressed. [Remarks: page 1]"

Thus, based on the above description of Applicant's claimed invention, and in view of the fact that Carter discloses, among other things, the egress (traffic) rate controller comprising the token / 'leaky bucket' of claim 1, the categorization of traffic according to 'classes' (traffic classes), and the plurality of buffers 25a-c and their 'current buffer occupancy', the Office maintains that Carter discloses the above described claimed invention, in general, and the argued features of claim 1, in particular.

Additionally, with regards to the claim, and in consideration of the Patel prior art reference, Applicant remarks (and admittedly acknowledges) that while Patel teaches a method of leaky buckets to achieve the determination of whether to transmit packets through a node based on other traffic and available resources, "nowhere does Patel teach the use of traffic class in a determination of whether there are sufficient resources

to transmit a packet, and certainly does not teach the use of a 'single bucket' with multiple threshold level registers for determining whether to transmit a packet based on the traffic class of the packet and on the 'current occupancy' of the bucket as indicated by the multiple threshold registers. The Office respectfully disagrees.

In support of his argument, Applicant remarks that while Patel discloses a *two-dimensional* and/or *three-dimensional leaky bucket* arrangement, "neither of the two dimensions is related to the *traffic class* of the packet" and that the cited portions of Patel " makes no reference at all to consideration of the *traffic class* of the packet. In response to the argument, the Office notes that the argued feature of categorizing 'traffic' according to "classes" is expressly disclosed by Carter, as discussed previously.

Patel additionally teaches a method and system for determining whether a packet should be transmitted through a node according to the 'current token availability' of the leaky bucket, wherein the leaky bucket 'tokens' may be 'two-dimensional (e.g. Time / Transmission Power 'resources') or even three-dimensional (e.g., Time / Transmission Power / Geographical Sector 'resources') [Abstract]. However, contrary to Applicant's argument, Patel also teaches the use of 'traffic classes' in addition to 'current occupancy' (token level / availability) of the bucket in determining whether to transmit a particular packet and/or to 'suppress' the transmission of certain packets while preferentially allowing traffic *of certain classes* to be transmitted. For example, Patel teaches in the Background of the Invention that "to support enhanced services,

multiple types or *Classes of Service* have been established and assigned certain Quality of Service (QoS) parameter that manage queues for each service type...The QoS parameters can be provisioned on a per IP connection or per flow basis through mechanisms such a RSVP or can be provisioned on aggregate flow *which are classified into 'service classes'*. [col 1, L35 – col 2, L2]. The argued feature of transmitting a packet according to 'traffic class', in addition to 'current token bucket occupancy', is thus expressly disclosed by Patel.

With regards to Patel, Applicant additionally argues that Patel does not teach the use of 'a single bucket' with multiple threshold level registers for determining whether to transmit a packet based on traffic classes and current occupancy of the bucket as indicated by the multiple threshold registers. However, in response to the argument, the Office notes that the argued feature of a 'single bucket' is nowhere to be found in the language of the claim recitation.

Claims 2-6 depend from claim 1, inheriting all of the features of the independent parent claims, and the rejection of the claims are thus maintained accordingly at least for the same reasons provided above for claim 1.

With regards to claim 16, Applicant argues that "the method including the limitation of suppressing packet transmission of a packet of a particular traffic class when current availability level of a leaky bucket is between two token availability threshold level" is not taught by either Carter of Patel. The Office respectfully disagrees. For example, with reference to Figure 8a, Patel expressly illustrates an embodiment wherein 'packets' belonging to a particular 'flow' or 'multiple classes of service' (Packets 2-4) require a 'token' of particular token bucket depth and/or width, as well as the current token availability of the system (e.g. Tokens 'Available' with respect to the Maximum or Current Bucket Depth / Width). The feature of "a current token availability level of a leaky bucket that is between two token availability threshold level" is thus expressly disclosed by Patel, and the rejection of claim 16 is accordingly maintained.

Claims 17-23 depend from claim 16, inheriting all of the features of the independent parent claims, and the rejection of the claims are thus maintained accordingly at least for the same reasons provided above for claim 16.

With regards to Claim 9, Applicant argues that neither Carter, Patel, nor Gracon discloses the recited feature of an ingress rate controller which includes a packet acceptance controller, the packet acceptance controller selectively randomly discards packets based on a current token availability level being within a token availability region specifying random packet discard of packets of the traffic class of the packet.

The Office respectfully disagrees.

In support of his argument, Applicant remarks that while the cited portion(s) of Gracon "teaches random discard of packets" under certain circumstances, nowhere is the "traffic class" of the packet used as a basis for the determination of whether to perform the random determination. However, the Office asserts that this is obvious in view of Carter's express disclosure of packets that are 'traffic-shaped' or groomed by an ingress / egress rate controller, the packets classified according to multiple 'Service Class' types, as discussed previously above.

Claims 10 and 12-15 depend from claim 9, inheriting all of the features of the independent parent claims, and the rejection of the claims are thus maintained accordingly at least for the same reasons provided above for claim 9.

With regards to Claim 24, Applicant argues that neither Carter, Patel, nor Gracon discloses the recited feature of selectively randomly discarding packets of a particular traffic class when a current token availability level of a leaky bucket tracking packets is between two token availability threshold levels. The Office respectfully disagrees.

In support of his argument, Applicant remarks that while the cited portion(s) of Gracon "teaches the use of multiple thresholds with which instantaneous queue size of a connection is compared", and that "depending on how the queue size compares with

various thresholds, packets of different colors are dropped (some randomly)", the 'colors' are not based on "traffic-class". However, as with claim 9, the Office asserts that this is obvious in view of Carter's express disclosure of packets that are 'traffic-shaped' or groomed by an ingress / egress rate controller, the packets classified according to multiple 'Service Class' types, as discussed previously above.

Claims 25-27 depend from claim 24, inheriting all of the features of the independent parent claims, and the rejection of the claims are thus maintained accordingly at least for the same reasons provided above for claim 24.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8, 11 and 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carter et al (hereinafter Carter), U.S. Patent Publication US 2003/0035374 A1 in view of Patel et al (hereinafter Patel), U.S. Patent 7,126,913 B1.

As per Claims 1 and 16, Carter in view of Patel discloses an egress rate controller monitoring content traffic transmitted from an edge network node of a packet-switched communications network node comprising [Abstract]:

a. a leaky bucket having an initial maximum number of tokens which decreases as packets are received in an associated output buffer at a reception token rate for transmission (e.g., token/leaky bucket shaper) [0084];

b. a plurality of token availability threshold level registers specifying a corresponding plurality of token amounts defining token availability regions (e.g., buffers 25a-c) [Fig. 4]; and

c. a packet transmission suppression controller (Router 13) [Fig. 2] selectively suppressing transmission of a packet having a traffic class association (decreasing buffer output rate) [Abstract] (e.g. Router with traffic rate control 304) [Fig. 3] based on a current token availability level being within a token availability region specifying transmission suppression of packets of the traffic class.

Further, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features the registers specifying a corresponding plurality of token amounts defining token availability regions and the controller selectively suppressing transmission of a packet having a traffic class association based on a current token availability level being within a token availability

region specifying transmission suppression of packets of the traffic class. The features are expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet. A power level for transmission of each packet over the time duration is further determined. Based on the time duration and the power level determined for each packet, a wireless resource impact is determined for each packet. Transmission resources are allocated to each packet based on the wireless resource impact determined for each packet [Abstract]. In particular, Patel discloses the recited features of the registers specifying a corresponding plurality of token amounts defining token availability regions ({X , Y} Token Regions) [Figs . 3, 4 & 8a-e], and the controller selectively suppressing transmission of a packet having a traffic class association [col 1, L36-40] based on a current token availability level being within a token availability region specifying transmission suppression of packets of the traffic class ({X , Y} Token Regions) [Figs . 3-5, 7, 8a-e, 11 and 13] [col 7, L42-53] [col 8, L21-35] [col 8, L60 – col 9, L60].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

Claim 16 recites that same limitations as claim 1 thus rejected on the same basis.

As per Claim 2, Carter discloses the egress rate controller claimed in claim 1, further comprising a classifier classifying received packets in accordance with a plurality of traffic classes (e.g., QoS Class of the packet) [0051] [Figs. 1 & 4].

As per Claim 3, Carter discloses the egress rate controller claimed in claim 1, further comprising a scheduler delaying packet transmission scheduling in accordance with a packet transmission suppression signal provided by the packet transmission suppression controller (Scheduler 305) [Fig. 3].

As per Claims 4 and 11, Carter in view of Patel discloses the egress rate controller claimed in claim 1, further comprising a bucket size register holding a value representative of a maximum number of tokens allocated to the leaky bucket.

Further, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited feature of the controller further comprising a bucket size register holding a value representative of a maximum number of tokens allocated to the leaky bucket. The features are expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited feature of the controller further comprising a bucket size register holding a value representative of a maximum number of tokens allocated to the leaky bucket (e.g., Max Bucket Depth of "10") [Figs. 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the recited feature of the controller further comprising a bucket size register holding a value representative of a maximum number of tokens allocated to the leaky bucket, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

Claim 11 recites that same limitations as claim 4, is distinguished only by its statutory category and thus rejected on the same basis.

As per Claim 5, Carter discloses the egress rate controller claimed in claim 4, further comprising an output buffer, the size of the leaky bucket, in tokens, being at most equal to the size of output buffer, employing an output buffer larger than the leaky bucket enabling suppression of packet transmission without discarding packets (e.g., Output Buffer 25) [Fig. 3] [0086] [Fig. 9].

As per Claim 6, Carter discloses the egress rate controller claimed in claim 1, wherein the egress rate controller is associated with an output port of the edge network node (e.g., Port 54) [Fig. 5].

As per Claim 7, Carter discloses an communication network node comprising at least one egress rate controller claimed in claim 1 (egress router 13a/b) [Figs. 2, 4 & 6]

As per Claim 8, Carter discloses an communication network node comprising at least one egress rate controller claimed in claim 1 associated with at least one output port thereof (egress router 13a/b) (Port 54) [Figs. 2, 4 & 6]

As per Claim 17 and 21, Carter discloses the method of effecting egress rate control as claimed in claim 16, wherein selectively suppressing packet transmission, the method further comprises a step of: selectively suppressing packet transmission scheduling (e.g., slow down traffic from buffer) [0073] (scheduler 302) [0078] [0081].

Claim 21 recites that same limitations as claim 17, and thus rejected on the same basis.

As per Claim 18 and 23, Carter discloses the method of effecting egress rate control as claimed in claim 17, further comprising a step of: rescheduling the packet for transmission [0073] [0078].

Claim 23 recites that same limitations as claim 18, and thus rejected on the same basis.

As per Claim 19, Carter discloses the method of effecting egress rate control as claimed in claim 16, further comprising a prior step of: classifying packets in accordance with a plurality of traffic classes (i.e., segregating packet traffic according to CoS) [0078].

As per Claim 20, Carter in view of Patel discloses the method of effecting egress rate control as claimed in claim 16, further comprising a step of:

a. determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket; and

b. selectively suppressing packet transmission if there are insufficiently many tokens available in the leaky bucket.

Further, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of the egress controller further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket; and selectively suppressing packet transmission if there are insufficiently many tokens available in the leaky bucket. The features are expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In

particular, Patel discloses the additional recited feature of the egress controller further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket (e.g., "token available for packet in queue?" 114/134) [Fig. 7] (packet size "L") [col 11, L36]; and selectively suppressing packet transmission if there are insufficiently many tokens available in the leaky bucket [col 8, L60 –col 9, L4] [Fig. 7] [col 9, L44-60] [col 10, L32-40] [Figs. 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited feature, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

As per Claim 22, Carter discloses the method of effecting egress rate control as claimed in claim 21, further comprising a step of: storing the packet in an output buffer (e.g., Output buffer 25) [Fig. 3].

2. Claims 9-10, 12-15 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carter et al (hereinafter Carter), U.S. Patent Publication US 2003/0035374 A1 in view of Patel et al (hereinafter Patel), U.S. Patent 7,126,913 B1, and in further view of Gracon et al (hereinafter Gracon), U.S. Patent, 6,987,732 B2.

As per Claim 9, Carter in view of Patel and in further view of Gracon discloses an ingress rate controller monitoring content traffic received at an edge network node of a packet-switched communications network node comprising:

a. a leaky bucket having an initial maximum number of tokens which decreases as packets received at a reception token rate are accepted (e.g., token/leaky bucket shaper) [0084];

b. a plurality of token availability threshold level registers specifying a corresponding plurality of token amounts defining token availability regions (e.g., buffers 25a-c) [Figs. 4 & 10];

c. a plurality of packet discard probability registers (buffers 51a-c) [Fig. 5], each packet discard probability register specifying a probability with which packets of a specific traffic class are to be dropped when a current token availability level is within a token availability region, and

d. a packet acceptance controller selectively randomly discarding packets having a traffic class association based on the current token availability level being within a token availability region specifying random packet discard of packets of the traffic class.

Further, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of an "ingress" rate controller, the controller further comprising threshold registers specifying a

corresponding plurality of token amounts defining token availability regions. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited features of an "ingress" rate controller (ingress control system 34), the controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability regions ({X , Y} Token Regions) [Figs . 3, 4 & 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

Additionally, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, neither expressly discloses the additionally recited features of each packet discard probability register specifying a probability with which packets of a specific traffic class are to be dropped when a current token availability level is within a token availability region, and a packet acceptance controller selectively randomly discarding packets having a traffic class

association based on the current token availability level being within a token availability region specifying random packet discard of packets of the traffic class. The features are expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited features of of each packet discard probability register specifying a probability with which packets of a specific traffic class are to be dropped when a current token availability level is within a token availability region ("Drop Probability" Pb) [col 7, L45], and a packet acceptance controller selectively randomly discarding packets having a traffic class association based on the current token availability level being within a token availability region specifying random packet discard of packets of the traffic class ("...the packet is randomly dropped based on the calculated Pb") [col 7, L49-53].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the invention resulting from the combination of Carter and Patel with the above recited features, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

As per Claim 10, Carter in view of Patel discloses the ingress rate controller claimed in claim 9, further comprising a classifier classifying received packets in accordance with a plurality of traffic classes.

Further, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of an "ingress" rate controller, the controller further comprising a classifier classifying received packets in accordance with a plurality of traffic classes. The features are expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the additional recited feature of an "ingress" rate controller (ingress control system 34) further comprising a classifier classifying received packets in accordance with a plurality of traffic classes [col 1, L36-41].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited feature, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

As per Claim 12, Carter discloses the ingress rate controller claimed in claim 9, further comprising an input buffer, the size of the leaky bucket, in tokens, being at most equal to the size of input buffer, employing an input buffer larger than the leaky bucket providing a slack in the number of packets available for transmission to mask the effects of the ingress rate control effected (Input Buffers 41a-c) [Fig 4].

As per Claim 13, Carter discloses the ingress rate controller claimed in claim 9, wherein the ingress rate controller is associated with an input port of the edge network node (Port 54) [Fig. 5].

As per Claim 14, Carter discloses a communication network node comprising at least one ingress rate controller claimed in claim 9 (Ingress router 130) [Fig. 6].

As per Claim 15, Carter discloses an communication network node comprising at least one ingress rate controller (Ingress router 130) [Fig. 6] claimed in claim 9 associated with at least one input port thereof (Port 54) [Fig. 5].

As per Claim 24, Carter in view of Patel and in further view of Gracon discloses a method of effecting ingress rate control comprising the step of: selectively randomly discarding packets of a particular traffic class when a current token availability level of a leaky bucket tracking packets is between two token availability threshold levels of a plurality of token availability threshold levels.

While Carter discloses substantial features of the invention, such as the ingress rate controller and the plurality of token registers of claim 1, he does not expressly disclose the recited features of the ingress rate controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability levels. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited features of an "ingress" rate controller (ingress control system 34), the controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability levels or regions ({X , Y} Token Regions) [Figs . 3, 4 & 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

However, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, neither expressly discloses the

additionally recited feature of the controller comprising the step of selectively randomly discarding packets of a particular traffic class when a current token availability level of a leaky bucket tracking packets is between two token availability threshold levels of a plurality of token availability threshold levels. The feature is expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited features of the controller selectively randomly discarding packets having a traffic class association based on the current token availability level being within a token availability region specifying random packet discard of packets of the traffic class (MinTh / MaxTh Packet Discard Parameters) (…the packet is randomly dropped based on the calculated Pb") [col 7, L28 – col 8, L12].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify Carter's invention with the above recited feature, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

As per Claim 25, Carter in view of Patel and in further view of Gracon discloses the method of effecting ingress rate control as claimed in claim 24, wherein randomly

discarding packets the method further comprises a step of: randomly discarding packets with a corresponding discard probability.

While Carter discloses substantial features of the invention, such as the ingress rate controller and the plurality of token registers of claim 1, he does not expressly disclose the recited features of the ingress" rate controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability regions. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited features of an "ingress" rate controller (ingress control system 34), the controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability regions ({X , Y} Token Regions) [Figs . 3, 4 & 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

However, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, neither expressly discloses the recited feature of the controller further comprising a step of randomly discarding packets with a corresponding discard probability. The feature is expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited feature of the controller further comprising a step of randomly discarding packets with a corresponding discard probability ("Drop Probability" Pb) [col 7, L45] ("...the packet is randomly dropped based on the calculated Pb") [col 7, L49-53].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the invention resulting from the combination of Carter and Patel with the above recited features, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

As per Claim 26, Carter discloses the method of effecting ingress rate control as claimed in claim 24, further comprising a prior step of: classifying packets in accordance with a plurality of traffic classes (e.g., QoS Class of the packet) [0051] [Figs. 1 & 4].

As per Claim 27, Carter in view of Patel and in further view of Gracon discloses the method of effecting ingress rate control as claimed in claim 24, further comprising a step of:

a. determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket; and

b. selectively discarding the packet if there are insufficiently many tokens available in the leaky bucket.

While Carter discloses substantial features of the invention, such as the ingress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of the method further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the additional recited feature of the egress controller further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket (e.g., "token available for packet in queue?"

114/134) [Fig. 7]. Patel additionally teaches that packets are only transmitted when sufficient tokens 52 are available in the token bucket 50 for the power level and duration of a transmission token 70 representing the packet [col 10, L31-41] [Figs. 8a-e]. Patel also teaches that if available resources do not exist to transmit a first packet in the queue 40, later queued packets for which sufficient resources are available will be transmitted to maximize use of available resources [col 9, L1-4].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

However, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, neither expressly discloses the additionally recited features of selectively discarding the packet if there are insufficiently many tokens available in the leaky bucket. The features are expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited feature of selectively discarding the packet if there are insufficiently many tokens available in the

leaky bucket (e.g. randomly dropping a packet based on drop probability Pb) [col 7, L28-53].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the invention resulting from the combination of Carter and Patel with the above recited feature, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

Conclusion

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenford Madamba whose telephone number is 571-272-7989. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Valencia Wallace Martin can be reached on 571-272-3440. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Glenford Madamba
Examiner
Art Unit 2151

/John Follansbee/

Supervisory Patent Examiner, Art Unit 2151